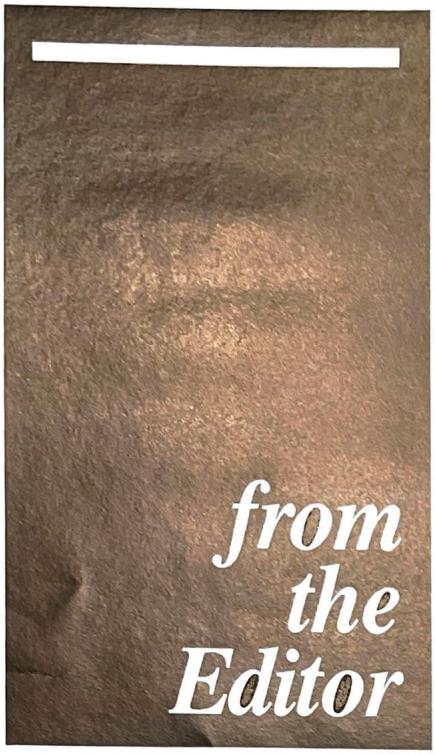
FINAL DRAFT

A QUARTERLY NEWSLETTER FOR AUTOCAD® USERS VOLUME 2, ISSUE 1

WINTER 1986/87



This is an interesting time in the CAD industry, with new developments occurring at faster and faster intervals. (Case in point: AutoSketch,™ our entry-level $79.95 CAD package, has more features than AutoCAD did when it was first introduced in '82.) The power of mainframes is now accessible to the PC user. "Forget PCs versus workstations versus mainframe," Autodesk chairman John Walker wrote in a recent company memo, "that's history." To quote Walker further on the future of CAD: "What we've been doing for the last four years is building a tool that embodies a language — drawings — that we use to represent reality. This is a language that goes back thousands of years that represents artifacts in a compact and unambiguous form.... When we move from AutoCAD as it exists today to a true 3D AutoCAD, we take the first step on the road to modeling — embodying a physical system in the computer. Once you've encoded a model, you can do many things with it — calculate physical properties, generate part programs to build it, ask 'what if' design questions, and so on.... Creating a realistic picture of a forest at sunset requires more software development than has gone into AutoCAD to date, and more computer

cont. on page 3

INTRODUCING AUTOCAD® VERSION 2.6

3D Level Two Incorporated

Since we first introduced AutoCAD in 1982, we've regularly updated and enhanced it. (Let's face it — you're only as good as your last release.) At November's Comdex show in Las Vegas, we announced AutoCAD version 2.6, available in March of 1987. New features in version 2.6 will significantly extend AutoCAD's 3D capabilities. According to Eric Lyons, Autodesk director of technology, they'll also provide increased flexibility and ease of use.

AutoCAD version 2.6 incorporates 3D Level 2, which allows for the generation of fully three-dimensional lines and plane sections (faces). 3Dlines and 3Dfaces can be drawn using full 3D coordinates originating from the keyboard, AutoLISP,™ or DXF files. The resulting image can be viewed from any direction and have its hidden lines removed using AutoCAD's current capabilities. Z-coordinate data can also be accessed from DXF and AutoLISP for use with post-processors.

AutoCAD 2.6 supports three entity types in a full three-dimensional representation: POINT, 3DLINE, and 3DFACE. The POINT entity has been extended to permit 3D input. 3DLINE and 3DFACE entities are similar to AutoCAD's existing LINE and SOLID entities but include a completely general Z coordinate.

Finite element analysis, architectural rendering, site planning, and many other applications can now benefit from fully generalized 3D lines and faces, noted Lyons. "You can now more accurately model real-world parts and objects showing any level of detail and realistic representations," he said. "In addition, tools will be provided with 2.6 for constructing such objects as surfaces of revolution, ruled surfaces, surfaces of translation, cones, spheres, toroids, boxes, and the like."

AutoCAD 2.6 also offers associative dimensioning. When a drawing entity is stretched, scaled, or rotated, its associated dimensions are automatically changed accordingly. Dimensioning attributes, such as tolerancing, units, and arrow size and shape, can also be modified.

One feature we know you've been hungrily waiting for: you can now use AutoCAD's ZOOM, PAN, and VIEW commands while another command is in progress. For example, you can start a line on screen, pan to follow the line as it goes past your current screen limits, and complete the line command at any level of detail.

AutoLISP, the LISP programming language embedded within AutoCAD, has been extended to allow access to the symbol tables (such as layer, linetype, and block). New user input functions have also been added. These features will be of particular value to third-party software developers.

The suggested retail price for version 2.6 will be $2,850. If you're a registered AutoCAD user working with earlier versions of AutoCAD, you can upgrade for the difference in suggested retail price between version 2.6 and the AutoCAD version you currently use.

Version 2.6 is fully upwardly compatible with all previous versions of AutoCAD. "AutoCAD 2.6 will open the door to true 3D modeling and visualization for hundreds of applications," said Eric Lyons. "The only limits to its use will be the limits of your imagination." ■

HARDWARE LOCK REMOVED:

FREE AUTOCAD UPDATES

In reponse to your comments, we've discontinued the use of our hardware lock device for copies of AutoCAD sold in the U.S. and Canada. If you're a registered user of AutoCAD 2.5, you'll automatically be mailed an unlocked copy of AutoCAD (version 2.52) at no charge.

"Every manufacturer of a 32-bit engineering workstation incorporates a means of protecting the property rights of those who sell software," noted Autodesk president Al Green. "Those who sell mass-market PCs and bemoan the lack of serious engineering software, which takes tens to thousands of man-years to develop, might ask whether there is a cause-and-effect relationship between the scarcity of such software and their strategic decision not to allow software vendors to prevent theft.

"In any case, we listen to our users. We may not always agree, but we listen. You've told us you don't like our protection device, so we're removing it."

Version 2.52 also fixes a number of problems that arose in some unique applications or in support of particular types of computer hardware configurations. "Reviewers have given AutoCAD the highest rating for being error-free," said Daniel Drake, executive vice president of Autodesk, "but a quarter of a million lines of code will always have some errors that sneak into the finished product.

"We decided to handle the update in this manner because we're working to build a reputation for providing the best service in the world," continued Drake. "We could ask each of our users, 'Do you run applications in AutoLISP™? Do you use IGES? Have you observed performance degradation in command scripts that do many block insertions?' — and so on. Or we can simply send the fix to everybody, including users who haven't seen a problem."

The update provides a new set of program disks with a set of instructions for installation. There's also a list of the fixes in the new version. "Many of our users will find the list acutely boring, because they've never experienced these problems," said Drake, "but those users who have experienced them will appreciate the list. The list is a break with tradition; people in the PC business generally refuse to admit the existence of minor problems until some really disastrous problem forces them to do so. We think serious PC users have a right to be treated as well as they would be if they were working with minicomputers or mainframes." ■

ANNOUNCING AUTOSHADE™

TURN YOUR AUTOCAD DRAWINGS INTO REALISTIC, FULL-COLOR IMAGES

AutoSHADE, coming from Autodesk in the first quarter of 1987, turns AutoCAD drawings into three-dimensional renderings that show color, perspective, depth, and surface shading. Rather than show clients line drawings of your design plans, you'll be able to provide full-color renderings that clearly show how the finished design will look. In effect, you'll be "photographing" designs that haven't yet been built or manufactured.

Realistic images can be computed in a matter of minutes, or even of seconds for simpler drawings. With the FAST SHADE function, you can quickly see a realistic rendering of a drawing. You can then fine-tune the images — changing colors, "light" positionings, and "camera" angles as desired — before using the RENDER function to receive a highly accurate final image.

With AutoSHADE, you'll no longer have to guess how your design will really look once constructed or manufactured; you'll be able to see for yourself.

AutoSHADE will have a suggested retail price of $500. The program works with AutoCAD 2.6 or later versions. ■

From the Editor, cont. from page 2

time than has been consumed by every AutoCAD user so far, worldwide. Modeling the forces on a tire rolling through a pothole exceeds the capabilities of any existing hardware and software.... I think that every practitioner in the modeling field agrees that the tools we have today are stone axes and bearskins compared to the tools that will evolve over the next ten years...."

While we're on the subject of evolution: In this issue are announcements on AutoCAD 2.6, which brings you 3D level two, and AutoSHADE, a shaded rendering package that turns AutoCAD drawings into images showing depth, perspective, and shading.

There's also news on developments in the service and support arena, to wit: In response to your comments, we've abandoned the hardware lock, and will provide free unlocked 2.52 versions of AutoCAD to all registered 2.5 users in the U.S. and Canada. We liked the idea of a hardware lock; it was a different species from the universally despised protection method, and it did the job of protecting our intellectual property and guarding against piracy. On the down side, however, some of you didn't like the hardware lock, and you told us so. So, in North America, it's gone.

Version 2.52 also includes several fixes, as well as, contrary to standard practice, a list of those fixes. As Dan Drake, Autodesk executive vice president, put it, "It's not enough these days to simply have the best product. You've also got to provide support above and beyond the call of duty." That's what we plan to do.

In other news, Autodesk chief executive officer John Walker has passed the presidency of Autodesk to Al Green, who has served as chief financial officer with Autodesk since 1984. This move allows Walker, who will continue serving as chairman of the board, to spend more time doing what he loves most — developing new products. Dan Drake, formerly Autodesk's vice president, has also changed positions and is now our executive vice president.

This issue offers an application story on the U.S. Bureau of Reclama-

tion's use of CAD in the design of a multimillion dollar, long-term project to bring water to the Arizona desert. Rob Toy, a civil engineer with the project, reports on AutoCAD's extensive use.

If you'd like us to write about you, please write or call us. We're always interested in hearing from you. If you have suggestions on what you'd like Final Draft to cover, let us know that too.

With warm wishes for a safe and peaceful 1987,

Marina Hirsch
Editor

STAFF

Marina Hirsch, Editor
Laura London, Communications Manager
Jeri Johnston, Art Director

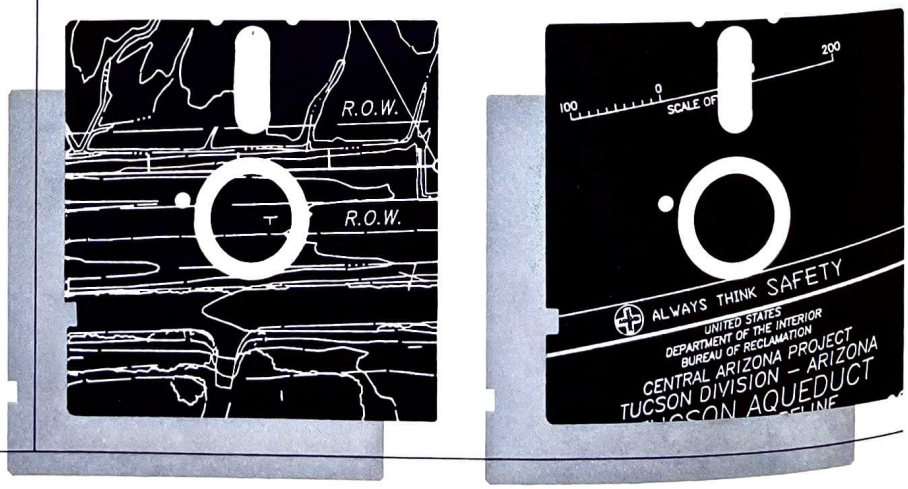
MAKING THE DESERTS BLOOM WITH MICRO-BASED CAD

U.S. Bureau of Reclamation Designs Water Transportation System With Aid of AutoCAD®

The problem is basic: central and southern Arizona need water, for agriculture and industry as well as people. The water in the rivers of Arizona's deserts has all been spoken for, and rainfall barely makes a dent in the area's hot, dry climate. One of Arizona's largest cities, Tucson, has pumped out so much of its groundwater for agriculture and municipal use that the land on which Tucson sits is literally sinking.

To help resolve the water imbalance the Bureau of Reclamation, a branch of the United States Department of the Interior, is building the long-planned Central Arizona Project (CAP), authorized by Congress in 1968. Administered by the Bureau's Arizona Projects Office (APO), CAP's goal is a major one — to bring water from the Colorado River (whose water supply is renewed yearly by rainfall and melted snow) to the Arizona desert.

The APO, with a staff of 567 federal employees, is managing the largest task ever undertaken by the Bureau of Reclamation, a $3.5 billion project that will provide water to Phoenix, Tucson, and other central Arizona cities, as well as to surrounding farms and Native American reservations. The project involves creating a 335-mile network of open canals, tunnels, pipe siphons, and pumping plants to form a water conveyance system. Two new dams and two renovated dams will serve as facilities for water conservation and flood control. The project is huge, in sheer physical size as well as scope: as an example, the pumping plant that lifts Colorado River water from Lake Havasu to start the water on its journey across Arizona is seven stories tall; each 22-foot section of the pipe used to carry the water under Arizona's dry rivers weighs as much as a Boeing 747.



The first gallons of water from the Colorado commenced flowing to thirsty Arizona land in March of 1985; the entire aqueduct is scheduled for completion within seven years. Some elements of the project, however, aren't expected to reach completion until the year 2000.

As Rob Toy, a civil engineer and Chief of the Engineering and Microcomputer Support Branch of APO's Office of Automated Data Processing (ADP) Support Services, explains, "The magnitude of this project is staggering. We get into all aspects of power engineering and civil engineering, as well as into other activities outside the engineering disciplines, such as environmental concerns and visual impact. A person could put his or her entire working life into one project."

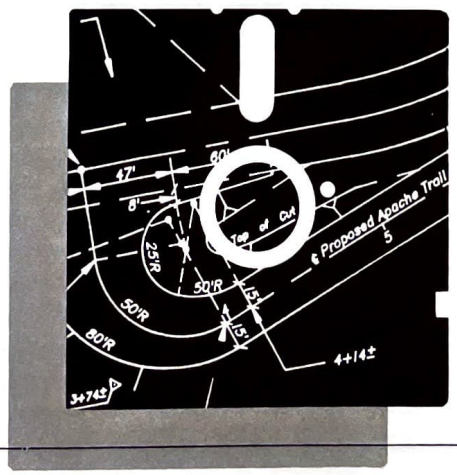
Constructing a project as enormous as CAP calls for careful management of two very scarce resources — people and time. Though APO's annual operating budget, granted yearly by Congress, has been approximately $185 million over the last few years, the APO also has a ceiling (called full-time equivalency) on the number of employees. "It's very difficult to hire any more engineers," explains Toy, "so how do we get the most out of the engineers we have?"

The answer has been to use microcomputers to put the power of CAD into the hands of the engineers, technicians, draftsmen, and others working on the Central Arizona Project. While the Bureau of Reclamation is planning a Bureauwide mainframe CAD system, procurement of this system isn't scheduled for some time. The APO was therefore selected to implement an interim system that would supplement the eventual Bureau-wide system. Chief of ADP Support Services Phil Metzler and his group went looking for an immediate solution. What they selected, after reviewing several systems, was a combination of IBM PC AT microcomputers and AutoCAD.

In the year and a half since micro-based CAD was brought into the Bureau, attitudes have changed; the CAD system, once viewed as a short-term interim answer to the Bureau's needs, is now being seen as an enhancement of and supplement to the Bureau's soon-to-be-selected mainframe CAD system. The reason for that switch, says Toy, was that micro-based CAD's capabilities were substantially greater than had been expected." With AutoCAD," he says, "we're achieving 90% of what we had anticipated from a mainframe CAD system at 10% of the price. The system is really putting data processing at the fingertips of the people who should be using it, not ADP Support Services, not my branch, but the users — the engineers and technicians." Because the system can be easily customized, APO was able to create menus specific to Bureau tasks as well as build libraries of commonly used shapes and title blocks. Such customization helped users become productive more quickly and ensured that drawings met or exceeded all Bureau of Reclamation standards.

To keep users in a familiar environment, APO extended its customization down to small details. Because line thicknesses are very important in Bureau

cont. on page 6



COMPUSERVE UPDATE

"We just revamped the Autodesk's CompuServe Forum," reports John Sergneri, Autodesk's SYSOP (systems operator). "We added four new data libraries/message subtopics. Included are two sections for unofficial wish list items, a section called 'Solutions' that covers known problems and workarounds for our products, and sections for AutoSketch and AutoLISP.

"We currently have about 2500 Forum members discussing everything from the virtues of COMPAQ DESKPRO 386s vs. those of IBM ATs to the fine points of networking. One of the main advantages to logging on to the Forum is getting up-to-the-minute information on Autodesk products. A second advantage is getting — and in many cases offering — help with AutoLISP. As anybody knows, trying to debug a program over the phone is virtually impossible; since CompuServe is a text-oriented facility, such tasks are much easier. We've found that users regularly help each other, in addition to the support they'll receive from me and my colleagues."

In short, added John, "We strongly encourage all AutoCAD users to join and participate in the Forum. As John Walker says, 'We constitute the largest CAD knowledge-base on the planet.' There's strength in numbers. So just log on and drop us a line." ■

High-Performance and High-Speed CAD

In the dim past of less than five years ago, mainframes were mainframes and PCs were PCs. You could have the power of the one or the economy of the other, and that was that. With the advent of the 68020- and 80386-based workstations in 1986, however, the rules of the game changed; the line between mainframes and PCs was essentially erased.

To meet the needs of users requiring the power of mainframe-class software, AutoCAD is now available in versions for several 32-bit workstations: the Apollo DOMAIN Series 3000 Personal Workstations, Sun Microsystems' Sun-2 and Sun-3 families of technical workstations, and the IBM RT PC.

The Sun Microsystem's Sun-3 family of technical workstations is based on a Motorola 68020 32-bit microprocessor and an advanced version of the UNIX operating system. Workstations in the Sun-3 family offer up to 16 megabytes of main memory and from 72 megabytes to 1.5 gigabytes of disk storage.

The Apollo DOMAIN Series 3000 Personal Workstations are based on the Motorola 68020 32-bit microprocessor and MC 68881 floating-point coprocessor, with up to 8 megabytes of main memory and from 155 to 348 megabytes of disk storage.

The IBM RT PC is based on a proprietary 32-bit processor. Known as Reduced Instruction Set Computer (RISC), the RT PC offers up to 4 megabytes of main memory and 210 megabytes of disk storage in IBM's AIX operating system environment.

In addition, the COMPAQ DESKPRO 386 is supported under the IBM version of AutoCAD. The first of a new generation of microcomputers to use Intel's 80386 microprocessor, the COMPAQ DESKPRO 386 combines minicomputer-level performance capability with the lower cost and individual productivity of a microcomputer — at a speed of 16 MHz. Further performance can be achieved with the addition of an optional 8 MHz 80287 coprocessor. ■

Deserts, cont. from page 5

standards, APO matched line colors on the AutoCAD screens to the colors of the caps of the well-known Kohinoor drafting pens. The #2 pen, with a green cap, is now associated with green lines on the screen, the red-capped #3 pen with red lines, and so on." When our draftsman goes to plot a drawing," says Rob Toy, "rather than using a red or green [capped] pen, he or she uses the corresponding line color. Then in the final drawing the line weights are correct."

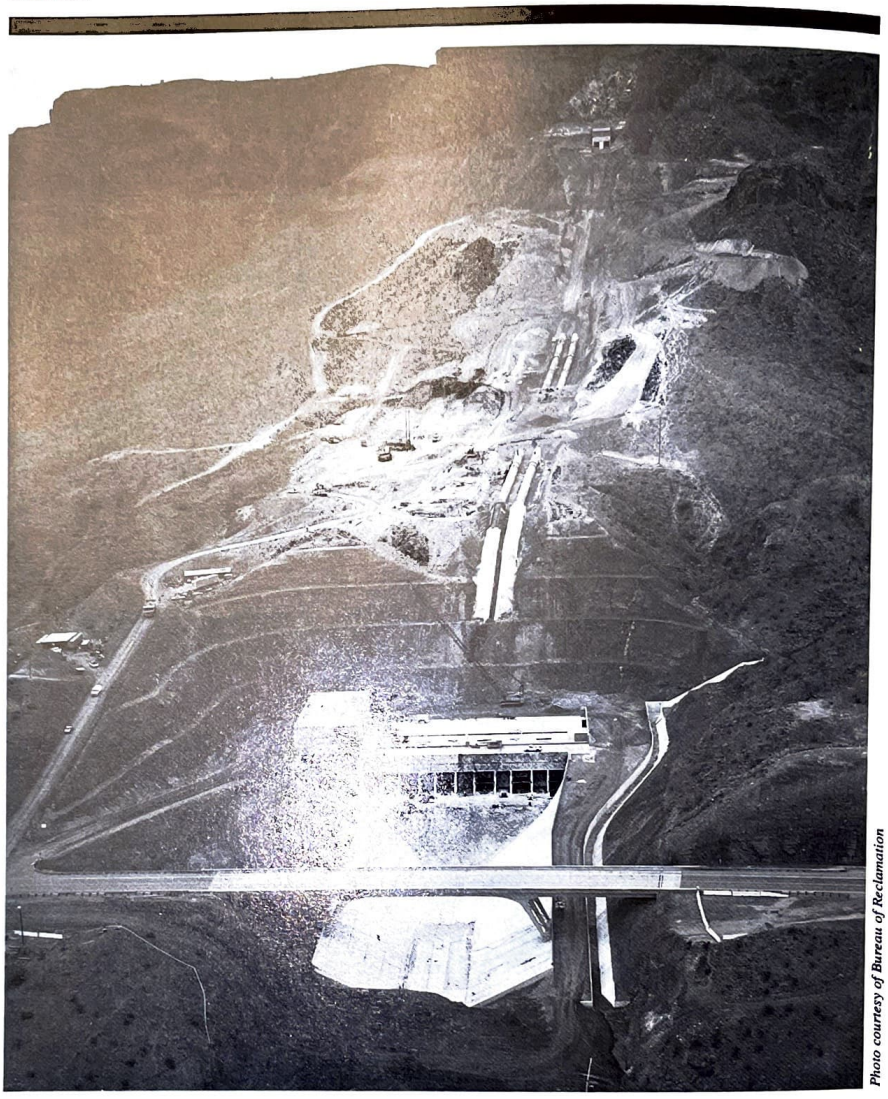


Photo courtesy of Bureau of Reclamation

From a drafting point of view alone, APO's microcomputer CAD system has clearly simplified the design process. On-screen, the drawing of a pumping plant, for example, can have different elements — structural, mechanical, electrical — stored on different layers, as if they were drawn on transparent overlays, so that when electrical engineers look at the drawing, they can turn off all the other layers and see only the electrical work. In addition, since many of the pumping plants are very similar, new drawings can be made quickly by simply copying and then modifying a previous drawing.

Matthew Miller, a mechanical engineer in APO's Power Engineering Division, comments, "Before, we were doing all these drawings by hand, and making changes was a time-consuming and tedious process. But with CAD, we can do a whole new drawing in just a matter of hours, incorporating modifications very easily."

APO staffers aren't just automating drafting tasks, however; they're also

integrating CAD into all parts of their project. Rob Toy explains: "Our whole approach is to attempt a field-to-finished-design implementation, to take field data coming in off survey recorders and feed it right into a CAD drawing, which will go first to soils classification, then to our design branches for design of the engineering feature, then to our drafting branch for final drafts, and finally to our lands division where staff members actually acquire the land."

Most of this ambitious plan is already functioning. When survey crews go into the field, for example, the survey instruments feed into data collectors, which in turn feed into the CAD system. "In addition," says Toy, "we've even got our CAD system talking to the [Hewlett-Packard] HP41CV, the handheld calculator, which we use essentially as a field notebook. A lot of our designers and surveyors are already familiar with the HP41; this way, they don't even need to learn new software. We let the HP41 process the information and feed it off to AutoCAD."

In the near future, APO survey crews will be using Data General One and GridCase portable computers in the field. Using APO's customized AutoCAD software on these portable computers, field crews can feed in measurements, view resulting drawings on the portable's screen, and check for errors without leaving the site. Previously, crews would return to their offices, process the information, and then go back to the field site if they found any errors. And because these computers have built-in modems for telecommunications, critical information can be sent immediately to the APO in Phoenix over the telephone lines, instead of being delivered by hand the next day.

Once field data has been pulled into the APO's CAD system, that data is quickly transferred to the project's widely separated offices and even to regional headquarters in Boulder City, Nevada, by uploading the AutoCAD files to one of several VAX computers and transmitting it via DEC-Net. As a result, AutoCAD drawing files have become a common format for exchanging information among regional offices. APO has found that electronic transmission is not only much faster than the previous method of shipping drawings by overnight mail, but also greatly reduces errors resulting from manual data entry and processing.

One initial stumbling block the APO encountered in its field-to-finished-design plan was topography. Designers need to work with topographic maps that show the rise and fall of the ground. To get such maps into a CAD database, the topography must be converted into a computer-readable form through a process called digitizing, which takes time and requires considerable skill. "Most of the Project's work with topography has been through photogrammetric methods," says Rob Toy. "Data in the form of maps was only stored on vellum and mylar drawings. We saw the need to combine this data into a machine-readable, digital format."

APO's solution to this particular problem is CAD/camera,™ another product from Autodesk, that translates an image scanned with an electronic camera to the vector form usable with CAD systems. "With CAD/camera, we can scan whole sections of topography and avoid hand-digitizing altogether," says Toy. "Of course, the images come in at some odd size because they're taken off 8½×11 pictures, so we use AutoLISP, AutoCAD's LISP programming language capability, to correct both scaling and rotation, and then do a little edge-matching routine that ties all these pieces together for an alignment."

In addition, the problem of getting the proper scale has disappeared because information is stored in precise "real-world" units (at a scale of 1:1) and then converted to the desired scale when a final drawing is plotted. Because the original information is never modified, there are no accumulated errors from different scalings." You want 1:200? We'll give you 1:200," says Rob Toy. "You want 1:500? We'll give you 1:500. And it's 1:500.000000 — it's exact. That's what's so impressive."

A good example of the kind of integration the APO has created with CAD is the tract map. This map shows the land through which a canal, pipeline, or other structure is going to pass and indicates which land needs to be acquired. The land must be fully surveyed and described, and precision is crucial. The

cont. on page 8

Authorized Training Center Attendance Skyrockets

Attendence at Authorized AutoCAD Training Centers™ (ATCs) has been booming lately, according to Autodesk training center coordinator Mark Sturges. During September of last year, Sturges noted, 170 attendees received AutoCAD training at ATCs. During September of this year, more than 1000 attendees received AutoCAD training at these independent centers. In short, interest in learning AutoCAD has risen dramatically.

To meet that demand, there are now more than 80 ATCs across the country. Many of these centers offer training in specific disciplines in addition to standard AutoCAD training. To find out which centers offer what — and which one is nearest you — call (800) 445-5415. Classes and specialized training available at selected training centers include:

Beginning through
  Advanced AutoCAD
AutoCAD for Managers
AutoCAD Translation to
  Mainframe CAD Systems
AutoCAD AEC
AutoLISP
AutoSketch
CAD/CAMERA or Other
  Scanning Services
CAD/CAM, CAD/CAM NC
Civil Engineering Applications
Curriculum Development
Educator/Teacher Training
Electrical Engineering Applications
Facilities Management
Finite Element Analysis
Landscape Architecture
Mechanical Engineering Applications
Networking
On-site Training
Other Third-Party Software
  Package/Drafting Enhancements
Printed Circuit Board Design
32-Bit Workstations/
  Sun, Apollo, IBM RT

Exactly who takes these classes? we wondered. According to Sturges, one-

quarter of all trainees are engineers, followed by drafters (24%), teachers (12%), designers (9%), and architects (8%). Supervisors (5%), artists and illustrators (3%), and people generally interested in CAD (14%) make up the remainder. Again, if you're interested in expanding your knowledge of CAD, the number to call is (800) 445-5415.

AUTODESK ANNOUNCES CITY SEMINAR PROGRAM

Autodesk currently has more than 1400 Authorized AutoCAD dealers, and ever-growing numbers of prospective CAD users. To increase communication with those who sell its products and those who use them, Autodesk is presenting free AutoCAD City Seminar Programs in ten major cities across the U.S. during coming months.

The two-day programs will feature seminars with Autodesk representatives and demonstrations of Autodesk products. All interested potential AutoCAD users and Authorized AutoCAD dealers are welcome.

One day will be devoted to the needs of potential CAD users. The program will introduce Autodesk software, and will feature a product line overview along with in-depth presentations on specific products.

Day Two will offer AutoCAD dealers information on new products, dealer policy and practices, value selling, and marketing techniques.

The first Autodesk City Seminar Program is slated for March 4 and 5 at the Hyatt Hotel adjacent to the Los Angeles International Airport. Prospective users and Authorized Dealers in Southern California are cordially invited to attend. For further information and for a schedule of upcoming programs, contact your local Authorized AutoCAD Dealer or Lucia Capron, Autodesk Program Coordinator, at (415) 332-2344, ext. 709. ■

Deserts, cont. from page 7

information collected in the field is processed on the Bureau's Cyber mainframe in Denver, Colorado, and then turned into a drawing.

"Previously," says Toy, "the turnaround time on these tract maps was anywhere from a week and a half to two weeks just for a person to draft where the canal or the roadway would be going through, and how much land we would have to buy. We now have a system which actually feeds this information from our host Cyber system in Denver straight into AutoCAD through AutoLISP to create the tract map. Total turnaround time now is 3½ minutes.

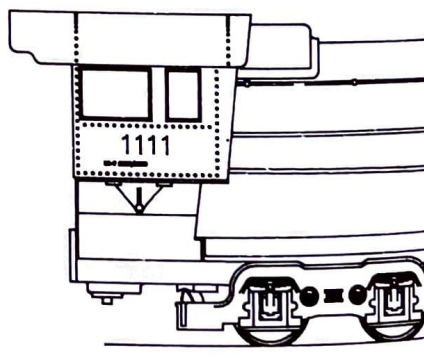
"It's a true integration of all these systems, because again, the challenge here was not to create a new system. It was to incorporate micro-based CAD into our existing system so that the combined systems' uses would be transparent as far as our users are concerned. They don't need to learn a new coordinate geometry package, for example. They still think they're running the old Cyber system — they're familiar with it, they know how to use it, and they're productive on it."

The bottom line on a project as large and as important as CAP isn't just efficiency — how many drawings can be turned out in a day — but also effectiveness — how good the work is. "What we're finding," comments Toy, "is that if a job can be done by hand in five days and by a microcomputer in one day, our engineers won't just do it in one day and sit around for the extra four days. They spend the next three days analyzing several different alternatives. At the end of the fourth day, you've still only got one final that you're going to use, so most people will say 'Wait a minute. It took you four days using automation and five days working manually — so what's the big savings?' Well, you've tried five more alternatives now, so the quality's much higher."

The value of being able to test different alternatives is something Toy, as a civil engineer, feels strongly about. "It's unlocking the creativity in our engineers. Civil engineering is not a creative field by nature. But these methods of redesigning, analyzing, and manipulating the data are really freeing the engineer's mind from the little number-crunching chores and giving him the ability to analyze theory and technique. 'What happens when I move my roadway here? What does it do to my quantities?' That's a feel you get through 30 years of experience, because in 30 years you've gone through 500 iterations of something, so you know it, you feel it. Now, through micro-based CAD and the ability to perform numerous iterations, we're trying to put those years of experience in the hands of our younger engineers."

Looking beyond micro-based CAD's value for drafting and designing, Rob Toy and his coworkers in APO see it as a powerful tool for integrating the many facets of their unique project. "What word processing has been to writers and spreadsheets to financial analysts, CAD is to engineers. That's how much of an impact it's having." ■

Want exposure? Send us your drawings! Drawings from Little Engines, Inc., a model train kit maker in Lomita, California, have been used in Autodesk promotional material both nationally and internationally.



AutoSketch for the 8087

AutoSketch, Autodesk's $79.95 introductory CAD package, is now available in an enhanced version that optimizes its use with an 8087 or 80287 math coprocessor.

AutoSketch works with or without a math coprocessor; if you use the program with a coprocessor, you'll find AutoSketch runs as much as three times faster. The enhanced-speed version of AutoSketch requires a math coprocessor, and can provide you with up to nine times the speed of using the standard version of AutoSketch without a coprocessor. You won't have to pay nine times the price, however; the enhanced AutoSketch is priced at $99.95. ■

AutoCAD Expo '87 on the way

AutoCAD Expo '87 is already well past the planning stages. The Expo will run concurrently with A/E/C Systems, June 24-26, 1987, at the Washington Convention Center in Washington, D.C. You'll see Autodesk product demonstrations, and have the chance to participate in a national user group meeting and a variety of technical sessions and tutorials with Autodesk representatives.

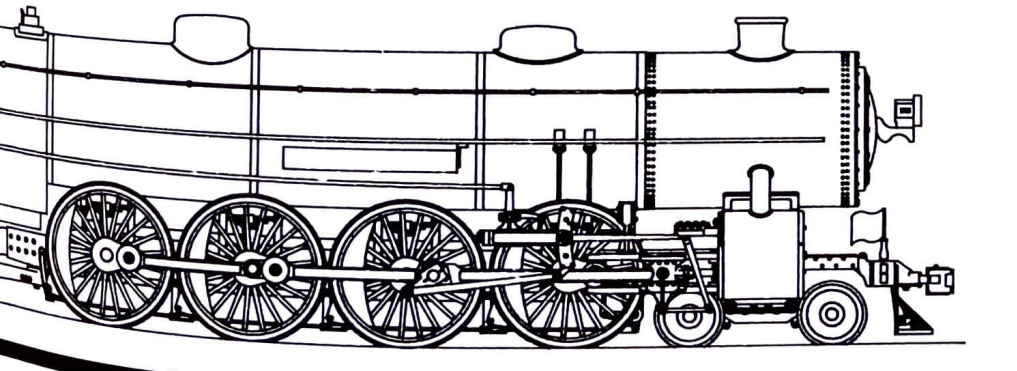
Mark your calendar, and keep an eye out for more information on AutoCAD Expo '87 in the next issue of Final Draft. ■

AutoCAD Expo Europe

In March of 1987, our U.K subsidiary will be hosting AutoCAD Expo Europe, an exhibition of third-party AutoCAD applications software that will run concurrently with the CADCAM '87 exhibition at the National Exhibition Centre in Birmingham, England.

AutoCAD Expo Europe will be a major exhibition for AutoCAD-related products, and will also offer a series of associated conference sessions. The show will serve as an opportunity for developers to show and sell their products not only to AutoCAD users and resellers in England, but also to the whole of Europe.

For more information, call Peggy Steffens, Autodesk promotions manager, at (415) 332-2344, ext. 703, or contact Finola McNicholl in London at 011 01 928 7868. ■



User Group Update

Less than half a year ago, there were all of 50 AutoCAD user groups nationwide. Today (as of this writing, that is), there are 105 AutoCAD user groups worldwide. User groups range in structure from formal chapters, with charters and newsletters, to casual get-togethers. Clearly, whatever their style, user groups offer a support and opportunity for information exchange that AutoCAD users appreciate.

Lucia Capron, Autodesk user group coordinator, reports that she receives as many as five inquiries each week from AutoCAD users interested in starting new groups.

If you're interested in starting a user group, give Lucia a call: she can send you a User Group Start-Up Kit that includes meeting ideas, sample AutoCAD user group newsletters and charters, a list of all existing AutoCAD User Groups, press releases announcing Autodesk's most recent products, magazine reprints regarding Autodesk, and a questionnaire, to be filled out and returned to her, so she can include you in future user group mailings.

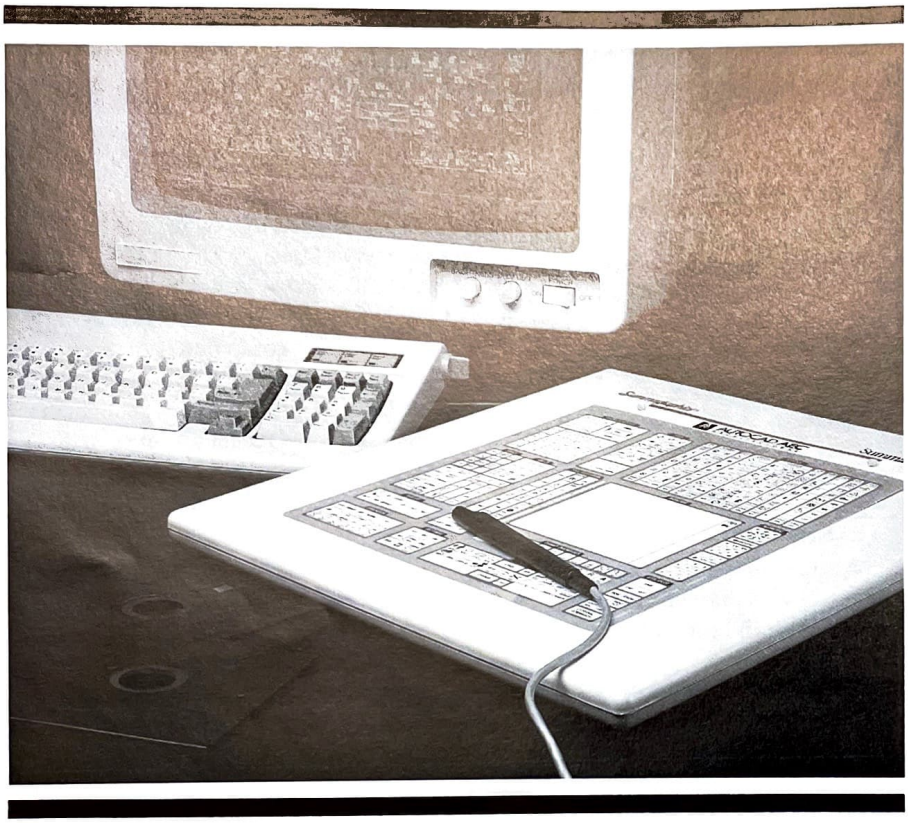
If you have any user group questions, call Lucia Capron, at (415) 332-2344 ext. 709, or write her at Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965. She'll be glad to hear from you.

SEND US YOUR DRAWINGS

Want to see your drawings in print? Send them to us, Autodesk Product Support, Drawing Archives, 2320 Marinship Way, Sausalito, CA 94965. We'll need both an A-size plot and a copy of your drawings on disk; please enclose a note granting us permission to use them. Any drawings we use in Final Draft or other Autodesk literature will be appropriately credited.

To those of you who have called or written us regarding future drawing competitions: submitting drawings to us now won't hinder you from submitting the same drawings in future competitions. Details on the next competition will be published in future issues of Final Draft. ■

AutoCAD AEC® Mechanical:



AutoCAD AEC is our product line of software tools for professionals in the architecture, engineering, and construction industries. The first in the series, AutoCAD AEC Architectural, customizes AutoCAD for the specific working needs of architects. The second in the series, AutoCAD AEC Mechanical, tailors AutoCAD for the needs of mechanical engineers designing building systems. AutoCAD AEC Mechanical will be available in the first quarter of 1987.

We interviewed programmer John Lynch, Autodesk manager of applications development, and asked him exactly what AEC Mechanical does. "In a nutshell," he said, "it automates and simplifies a mechanical engineer's design and drafting work." We pressed for more detail. "In many cases, complex entities and processes (such as pipe labels and shape insertion, for example) can be reduced to single-step functions; the time saved can be enormous," Lynch advised. "AEC Mechanical provides a special schematic mode for doing quick layout diagrams, powerful macros for creating parametric fitting and shapes interactively, and a simple, specialized interface to AutoCAD for designing mechanical building systems."

To go into even more detail: With AEC Mechanical, you'll have access to an extensive library of industry-standard symbols. Mechanical system diagrams for pipe layout and risers, HVAC equipment, fire protection, controls and meters, and duct layout can be created and edited easily. Shapes are included for valves, traps, vents, fixtures, and actuators that can be automatically inserted into a line. A special line-labeling facility is included, with a selection of over 80 industry-standard pipe labels.

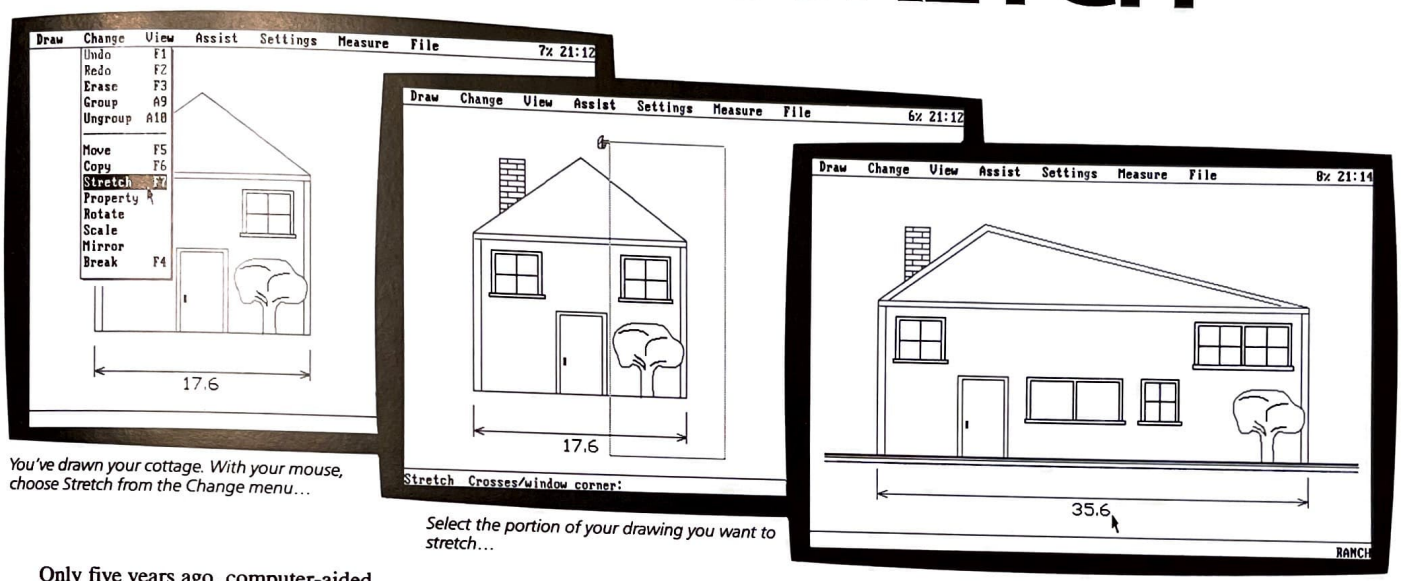
Duct layout and design can be accomplished with either single- or double-line diagrams, and the user can even automatically convert from single-line to double-line diagrams. Duct fittings, from simple expansion fittings and elbows to complex wye fittings and intersections, are created accurately and quickly. The development of riser diagrams complete with symbols for branches, vents, fixtures, and connections is substantially automated.

AEC Mechanical features a graphic interface to popular duct analysis software that enables you to design, calculate, and draft on a single drawing.

The program also includes extensive symbol libraries for HVAC equipment and fire protection layout. Equipment layout is completely automated with symbols for many air movement system components including boilers, fans, chillers, pumps, and tanks. Shapes are also available for controls and meters, tags, bubbles, breaklines, and titles.

AutoCAD AEC Mechanical has a suggested retail price of $500, and requires AutoCAD 2.5 or later. ■

Turn Your Cottage into a Ranch House for $79.95. With AUTOSKETCH™



You've drawn your cottage. With your mouse, choose Stretch from the Change menu...

Select the portion of your drawing you want to stretch...

Move the pointer, click, and the job's done. (The dimension changes automatically.) Add the finishing touches, and your ranch house is complete.

Only five years ago, computer-aided design was affordable only by the very largest companies. Then came AutoCAD,® which brought CAD to the personal computer, and to the desktops of more than 60,000 architects, engineers, and designers.

But what about you? Are you one of the tens of millions of others who draw? At home: laying out your office, designing your dream house, or making carpentry plans. At work: making facility layouts, assembly instructions, shop-floor setup diagrams, and inspection checklists. Or at school: learning the principles of drawing and design.

You're probably still drawing the hard way—by hand. You can't justify the price of a full CAD system, nor do you want to spend the time to master a system with the complexity and power demanded by a full-time professional. Now, there's a computer-aided design tool for you.

Introducing AutoSketch

AutoSketch is full-function computer-aided design software for creating line art. You draw with a mouse, using pull-down menus and dialogue boxes. If you're like most AutoSketch users, you'll be drawing in less than an hour. Your drawings will be far more accurate, and you'll spend less time creating them. With AutoSketch, you can revise a drawing and make a new clean copy in seconds: no more erasure marks or redrawing the final version.

A New Way To Draw

AutoSketch automatically draws lines, arcs, circles, polygons, and smooth curves. You can add text of any size. You can build libraries of frequently used symbols, draw in colors, and use differing line types to distinguish objects. You can even draw on multiple layers and look at them in any combination.

Freedom to Experiment

Once you've drawn something, you can move, copy, rotate, mirror, and erase until it's just right. You can work on objects as a group, or break groups apart. Change your mind? You can Undo anything you've done. Change your mind again? Use Redo and put it back.

Accuracy You Can Count On

AutoSketch drawings are precisely dimensioned, with an accuracy of more than six decimal places. You can have AutoSketch dimension your drawings just by pointing to the distances to be measured. When you scale or stretch the drawing, the dimensions change automatically. You can "zoom in" to work in detail, then "zoom out" to see the whole picture. AutoSketch even allows you to measure angles and areas, so you'll know how much carpet to buy for that new room you're planning.

Make A Hard Copy Easy

When your design is done, you can make a paper copy on any one of a large selection of printers and pen plotters. And you can print any section of your drawing as well, at any scale you like.

Enhanced Speed

If you have an 8087 or 80287 math coprocessor, you can run AutoSketch as much as three times faster. With the enhanced version of AutoSketch, which requires a math coprocessor, you can experience up to nine times the speed, and for a price — $99.95 — that isn't nine times higher.

If, over time, you want to go further with computer-aided design, you can move on to AutoCAD 2.5 and take your AutoSketch drawings with you—they're fully compatible.

Find out for yourself why so many professionals draw with computers. If you have a PC, you can enter the age of computer-aided design for just $79.95. Why wait? For the name of an authorized dealer near you, call (800) 445-5415. Or simply order direct with a credit card by calling (800) 772-9200, ext. 329.

AUTOSKETCH™

from the Makers of AutoCAD

Autodesk, Inc.
2320 Marinship Way
Sausalito, CA 94965
(415) 331-0356

AutoSketch runs on IBM PC, XT, and AT PCs and 100% compatibles. We recommend 512K RAM minimum and two floppy disk drives or one floppy disk and a hard disk. AutoSketch supports the Hercules™ Graphics Card, the IBM Color Graphics Adaptor (in monochrome mode), or the IBM Enhanced Graphics Adaptor with 256K graphics memory and the Enhanced Graphics Display. You can use the Microsoft® mouse (or compatible), or a joystick as your pointing device. Output may be printed on Epson, Hewlett-Packard LaserJet™ IBM Proprinter XL™ Okidata, TI Omni™ or PostScript™ printers. Hewlett-Packard and Houston Instrument pen plotters are supported.

BULK RATE
U.S. POSTAGE
PAID
SAN FRANCISCO, CA
PERMIT NO. 2

AUTODESK, INC.

2320 Marinship Way
Sausalito, CA 94965

MDFLDFT002-01